

**REMARKS:**

In the amendments above, Claims 1, 14, 18-20, and 24-26 have been amended, and Claim 3 has been cancelled, to more particularly point out and distinctly claim Applicant's invention.

Claims 1, 14, 20, 24, and 26 were objected because of informalities. The Examiner's attention is directed to the amendments above, where amendments to the claims are believed to overcome the objections.

Claims 18, 19, 25, and 26 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The claims were amended above, wherein the phrase "to another electronic representation" was changed to "to a different electronic representation", and further references mention "said different electronic representation."

Claims 1-4 and 7-29 have been rejected under 35 U.S.C. § 103(b) as being anticipated by Keyes et al., U.S. Patent No. 4,393,402 ("Keyes") in view of Han et al., U.S. Patent No. 6,408,050 ("Han").

Applicant respectively traverses this rejection.

With regard to Claims 1 and 20, Keyes describes a dual-energy apparatus where two video images are obtained: one resulting from high-energy X-rays and the other resulting from low-energy X-rays. Specifically, Keyes mentions in Column 2, lines 43-47, that

"The high and low energy beams always occur in close succession, . . . so that substantially no motion occurs between X-ray pulses."

Applicant respectfully points out that Claim 1 specifically mentions that "said at least two electronic representations are measured simultaneously . . ." (emphasis added).

Obtaining two representations simultaneously is substantially different than when the representations are obtained "in close succession" as in Keyes – thus eliminating altogether motion artifacts which are critical in angio and cardiac applications. Using a single pulse of the polychromatic X-ray beam enables obtaining two representations simultaneously, whereas Keyes specifically mentions two separate pulses, one of low energy and a second of high energy and can solely reduce the motion artifacts.

The Examiner states that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Keyes et al. to have the X ray beam be polychromatic . . . ." Applicant notes that since 1981, attempts have been made to create systems that minimize the gap between the two successive images taken from two separate X-ray pulses to reduce motion artifacts, but none use or insinuate taking advantage of a polychromatic beam to generate two or more electronic representations from a single image. That the apparatus and method of the present invention use a polychromatic X-ray beam to perform dual analysis that enables obtaining multiple images from a single X-ray pulse while eliminating motion artifacts and reducing exposure, is certainly not suggested by Keyes and/or Han and is not obvious.

Although Han describes in its x-ray imaging system shown in Figure 1, an x-ray detector comprising a plurality of pixels with readout electronics by which x-ray photons can be separated into different energy groups, a single discriminator (106) is used for the whole plurality of pixels. This fact and the use of memory (108) imposes difficulties in implementing Han's method and establishing meaningful results and makes it impossible to use Han's system for angio and cardiac applications. Therefore, it would not be obvious for a man skilled in the art to modify Keyes as taught by Han.

Claims 1 and 20 have been amended above to better emphasize the inventiveness of the apparatus and method over the prior art mentioned in the Office Action.

Since Claim 3 has been cancelled, no discussion of that claim is necessary.

With regard to the Examiner's rejection of Claim 4, Applicant points out that Han tries to avoid use of scintillator material (Column 2, line 67 - "without the need for an intermediary scintillator to convert the X-ray photons to optical photons . . ."), whereas Applicant claims the use of scintillator material for his invention.

With regard to the rejection of Claims 7-9, it should be noted that although Han uses a programmable threshold, Han uses it for obtaining images from multiple X-ray beams. In the invention claimed herein, there is use of multiple thresholds for a single image.

Furthermore, in Claims 8 and 9, a pulse shaper and counters are mentioned which do not appear in any of the prior art mentioned by the Examiner.

With regard to the rejection of Claim 10, it should be noted that Keyes mentions the use of Iodine solution in the background. This is a well-known contrast agent, but the reference is not related to the specific invention.

With regard to the rejection of Claims 13 and 27, it should be noted that the apparatus and method in Claims 1 and 20, respectively, are inventive, and thus use of the invention for coronary blood vessels is also inventive despite mention in the prior art of different systems and methods for examination of identical body types. The same applies to the rejections of Claims 15, 16, 28, and 29.

Claims 5 and 6 have been rejected under 35 U.S.C. § 103(b) as being unpatentable over Keyes, Han, and Homma et. al., U.S. Published Patent Application No. 2005/0017189 ("Homma").

Applicant respectively traverses this rejection.

Both CsI and Si photodiodes were mentioned by Homma and used in other applications, but it is not obvious that they can be used for fast energy-discrimination of angio and cardiac fluoro studies. Applicant describes a plurality of Si Photodiodes, each connected to adjacent electronics, such that parallel signal processing can be utilized. This can be done even when a CsI Scintillator is used, despite the fact that such scintillators suffer from "after glow" effect (signal memory). Applicant mentions a pulse shaper, and it should be noted that pulse shape analysis can correct the memory defects that may be introduced in such case.

For the above reasons, Applicant submits that the claims are now in proper form and are patentable over the prior art. Therefore, the rejections under 35 U.S.C. §§ 112 and 103(a) should be withdrawn.

Reconsideration and allowance of all the claims herein are respectfully requested.

Respectfully submitted,

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William H. Dippert  
Registration No. 26,723

Eckert Seamans Cherin & Mellott, LLC  
10 Bank Street, Suite 1061  
White Plains, New York 10606  
Telephone: 914 286-2909  
Facsimile: 914 949-5424  
e-Mail: wdippert@eckertseamans.com